REMARKS

Applicant respectfully requests reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

Claims 10-13 have been canceled.

New claim 15 has been added.

This amendment adds, changes and/or deletes claims in this application. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier.

After amending the claims as set forth above, claims 1, 3-9, 14, and 15 are now pending in this application. Claims 7-9 and 14 have been withdrawn from consideration.

Rejections under 35 U.S.C. § 102

U.S. Patent No. 3,522,139

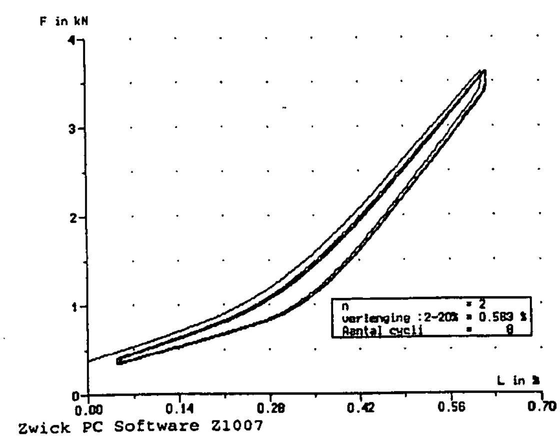
Claims 1-6 and 10-13 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 3,522,139 to Redmond (hereafter "Redmond"). This rejection is respectfully traversed.

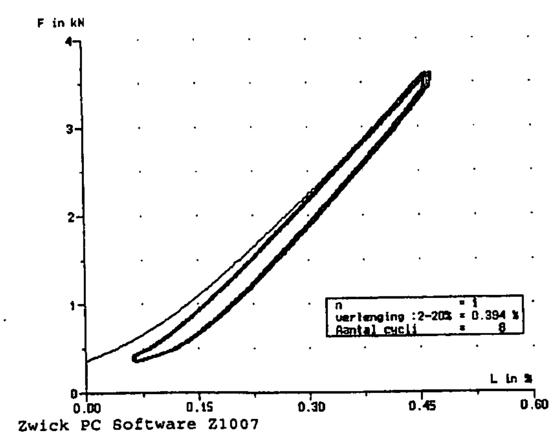
A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). See generally M.P.E.P. § 2131.

Redmond discloses a reinforced rubber or plastic article that includes individual metal wires that are embedded in a sheathing matrix which can be subsequently twisted. See Redmond at col. 1, lines 14-72. Redmond discloses that the sheathing matrix has a lower

modulus than the metal wires. See Redmond at col. 1, lines 39-48. Thus, Redmond does not disclose a steel cord consisting of at least two strands twisted together, as recited in claim 1, because Redmond discloses that individual metal wires are embedded in a sheathing matrix.

Furthermore, Applicant submits that because the sheathing matrix of Redmond has a lower modulus than the metal wires, the sheathing matrix will be transversally compressed (either elastically or plastically), which will create a load-elongation curve that is bent at low tensile forces. To demonstrate this, Applicant has prepared a load-elongation diagram of a 19+6x7 cord (although not produced along the lines of the invention), wherein only the 19x1 core has been coated with a plastic coating (notably polyurethane), which is shown on the left side below, and exactly the same cord without a coated core, which is shown on the right side below (but also not produced along the inventive specification). The difference in structural elongation between these cords is clear, which illustrates what will happen when a soft sheathing matrix is present between the steel filaments of the core and the outer strands, as disclosed by Redmond. As shown in the diagrams, a sheathing matrix will lead to an <u>increased</u> structural elongation, not a decreased structural elongation.





For at least the reasons discussed above, Redmond does not anticipate claims 1-6 because Redmond fails to disclose all of the features of claim 1.

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U.S. Patent No. 4,087,295

Claims 1-6 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,087,295 to Sargent *et al.* (hereafter "Sargent"). This rejection is respectfully traversed.

Sargent discloses a process for the mechanical and thermal treatment of steel wire to make a twisted strand or cord. See Sargent at col. 1, lines 6-10, and col. 2, lines 22-26. Sargent discloses the use of "twisters of the type normally employed for twisting textile fibers," which are known in the field of steel cords as "bunchers." See Sargent at col. 2, lines 11-14. It is known in the art that when bunching equipment is used to produce a steel cord, additional measure must be taken to reduce the elastic torque of wires that originates from the twisting of the filaments, such as to "kill" the cord or strand. See Sargent at col. 1, lines 29 to 32.

However, Sargent does not disclose a steel cord with the features of claim 1. Sargent discloses a first example in which wires are twisted in the Z direction to form a strand, and then four strands are twisted in the Z direction to form a cord. See Sargent at col. 4, line 50, to col. 5, line 7. Thus, the first example of Sargent is not a cord that includes at least two strands twisted in a first lay direction, wherein each of the strands includes at least two steel filaments twisted in a second lay direction opposite to the first lay direction, as recited in claim 1. The second example of Sargent regards a strand, not a cord. See Sargent at col. 5, lines 55-68.

The third example of Sargent regards wires twisted in the Z direction to form a strand, and four such strands are twisted together in the S direction to form a cord. See Sargent at col. 6, lines 3-15. Such a cord would be a 4x7x100 μm cord for the following reasons. First, 7x100 μm strands are formed by twisting wires up to 4 Z twists per inch, i.e. $n_s = 157$ Z twists per meter (6.35 mm Z lay). Then four such strands were twisted together with 3 S twists per inch, i.e. $N_c = 118$ S twists per meter (8.46 mm S cord lay). Consequently, the number of twists per meter of the <u>strand</u> in the <u>final</u> cord is $N_s = 157 - 118 = 39$ twists in Z (or 25.4 mm in Z) as the twists in the strand are removed by the 'twister' because it turns opposite to the direction of the strands.

However, the strand has initially already obtained a twist of N_c+N_s, namely 157 Z twists per meter from the very beginning, which greater than the amount recited in claim 1. Hence, the strand of Sargent has initially obtained 118 twists in excess of the ones finally found back in the strand. As discussed in the application on page 11, lines 8 to 12, "Any excess of twists given to the strands – even if these twists are finally taken out of the strand upon bunching of the cord – leads to 'looseness" of the strands, which is reflected in the undesired structural elongation, causing the dimensional control problem of the synchronous belts". Thus, the third example of Sargent also does not include the features of the cord recited in claim 1.

Furthermore, Applicant submits that the subsequent thermal treatment of the steel cord as described Sargent's third example will not reduce this structural elongation. In fact, the effect of the thermal treatment is annihilation of retained tensile, bending or torsional stresses. See Sargent at abstract; col. 1, lines 51 to 54; col. 4, lines 5 to 8. Such a heat treatment restores the steel structure to a state without stress <u>but does</u> <u>not alter the shape of the wire</u>. Hence, a wire that has been given an excessive amount of twists will not lose the "looseness" referred to in the application because such "looseness" is the result of a <u>plastic</u> (i.e. acquired) bending and torsion deformation of the filament. The thermal treatment only removes the <u>elastic</u> bending or torsion, i.e. bending or torsion that seeks to restore the wire to its original shape.

For at least the reasons discussed above, Sargent does not anticipate claims 1-6 because Sargent does not disclose the cord of claim 1. Reconsideration and withdrawal of this rejection is respectfully requested.

<u>U.S. Patent No. 5,843,583</u>

Claims 1-6, 10, 12, and 13 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,843,583 to D'Haene *et al.* (hereafter "D'Haene"). This rejection is respectfully traversed.

D'Haene discloses a steel cord for the reinforcement of an elastomer. See D'Haene at col. 1, lines 5-6. The cord can include two groups of steel filaments, in which the first group

of filaments can be twisted and the second group of filaments can be twisted around the first group so as to form an unsaturated layer around the first group so that spaces exist in the layer between two or more steel filaments of the second group. See D'Haene at col. 3, lines 32-41.

One of ordinary skill in the art would understand that the cord described by D'Haene is a strand of the layered type, which is different from a cord consisting of strands, as recited in claim 1. The embodiments of D'Haene are 2+n, 1+m, 2+m and 2x0.33+6x0.33, 1x0.38+5x0.38 strands, which are not cords as recited in claim 1. See D'Haene at column 3, lines 44 to 53.

Moreover, the one stranded cord mentioned in D'Haene is of the type 3x7x0.22 HE. Table 1 of D'Haene discloses that the lay directions of the strand and cord are both in S direction, i.e. the cord is of the "Lang's lay" type. A person of ordinary skill in the art generally knows that such High Elongation cords are of Lang's lay make, i.e. are of the type 'sS' or 'zZ'. Thus, the cord of D'Haene is not a cord that includes at least two strands twisted in a first lay direction, wherein each of the strands includes at least two steel filaments twisted in a second lay direction opposite to the first lay direction, as recited in claim 1. To demonstrate this by example, page 19 of the Bekaert Steel Cord catalogue (publicly available as of August 1999) is attached to this response. This provides an exemplary definition of "Lang's lay" and "High Elongation" cords. D'Haene discloses in column 2, lines 26, details of how to produce to obtain such a high elongation cord.

D'Haene is mainly concerned about increasing a total elongation at break, in particular the elastic and plastic elongations, in order to find an alternative to the existing High Elongation cords. To obtain this goal, an <u>increased</u> structural elongation can be created by imparting an undulation to individual filaments. See D'Haene at col. 3, lines 57 to 63. D'Haene also mentions that some steel cord constructions do not have a substantial structural elongation. See D'Haene at col. 5, lines 14 to 15. However, D'Haene does not specify <u>what</u> cords have such a lower structural elongation.

For at least the reasons discussed above, D'Haene does not anticipate claims 1-6 because D'Haene does not disclose the cord of claim 1. Reconsideration and withdrawal of this rejection is respectfully requested.

Rejections under 35 U.S.C. § 103

Claims 10-13 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Sargent in view of U.S. Patent No. 4,123,894 to Hughes *et al.* (hereafter "Hughes"). Claims 10-13 have been canceled. Withdrawal of this rejection is respectfully requested.

Claim 11 is rejected under 35 U.S.C. § 103(a) as being unpatentable over D'Haene in view of Hughes. Claim 11 has been canceled. Withdrawal of this rejection is respectfully requested.

New Claim

New claim 15 has been added. Claim 15 depends from claim 1 and is allowable over the prior art for at least the reasons discussed above and for its additional recitations.

Conclusion

Applicant submits that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check or credit card payment form being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for

such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

Date September 12, 2008

By [signature] Reg. No. 62,582

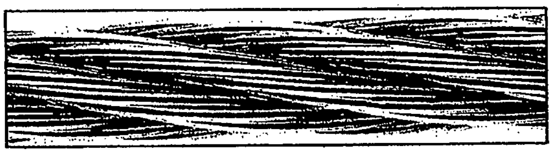
for Glenn Law
Attorney for Applicant
Registration No. 34,371

FOLEY & LARDNER LLP
Customer Number: 22428
Telephone: (202) 672-5426
Facsimile: (202) 672-5399

Tyre cord

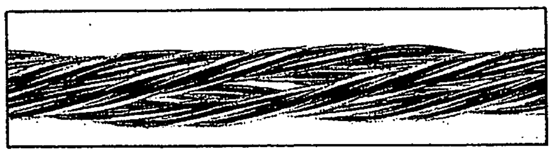
Product types

REGULAR CORD (1)
Cord in which the direction of lay in the strands is opposite to the direction of lay in closing the cord.



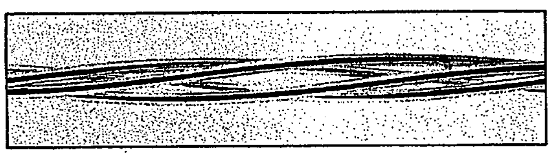
1

LANG'S LAY CORD (LL) (2)
Cord in which the direction of lay in the strands is the same as the direction of lay in closing the cord.



2

OPEN CORD (OC) (3)
A cord in which wires are loosely associated and movable relative to each other to enable rubber to penetrate into the cord.



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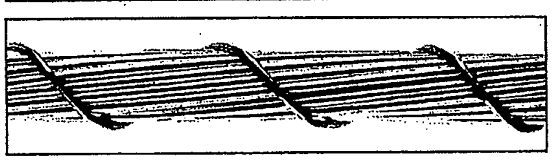
COMPACT CORD (CC) (4)
A cord in which the filaments mainly have linear contact with each other.



4

HIGH ELONGATION CORD (HE) (5)
Lang's lay cord in which the strands are loosely associated and movable relative to each other, to allow the cord to be stretched substantially at a given load.

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